

EXHIBIT 3

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION**

Blue Spike, LLC,

Plaintiff,

V.

Texas Instruments, Inc., et al.,

Defendants.

卷之三

CASE NO. 6:12-cv-499-MHS-CMC

LEAD CASE

Jury Trial Demanded

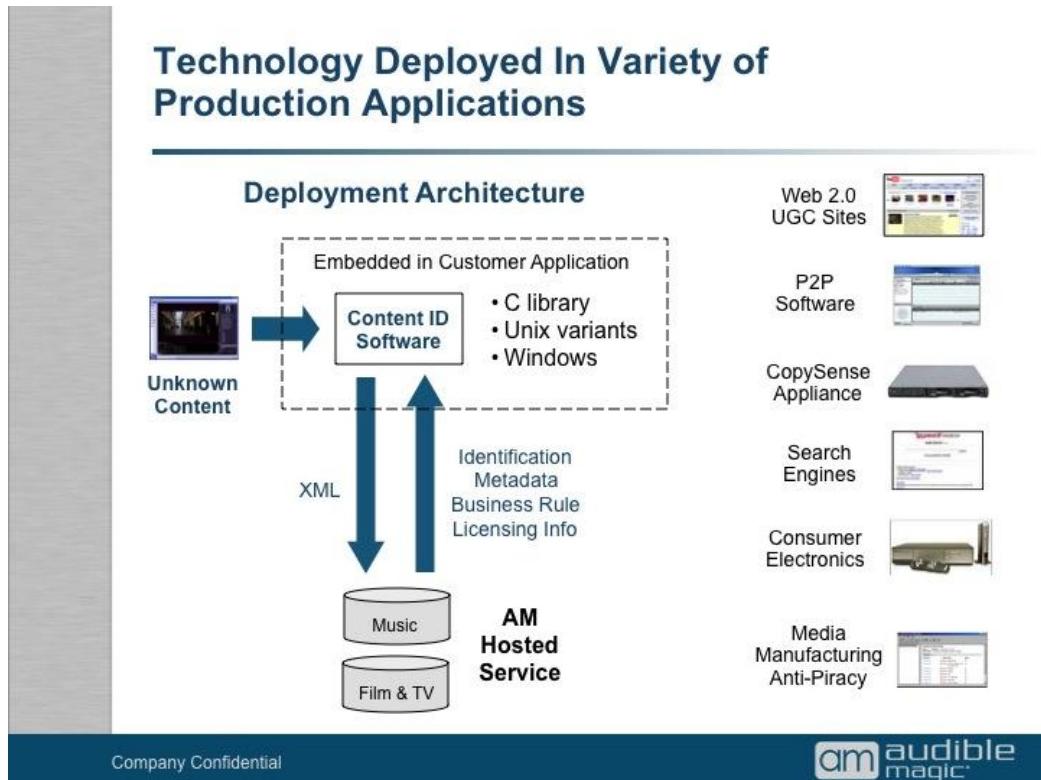
**TECHNICAL EXPERT REPORT
OF AHMED H. TEWFIK, PH.D.
REGARDING INFRINGEMENT**

**HIGHLY CONFIDENTIAL –
OUTSIDE ATTORNEY'S EYES ONLY**

Table of Contents

TABLE OF CONTENTS	1
I. BACKGROUND	2
II. LEGAL STANDARDS	4
III. SCOPE OF WORK	5
IV. LEVEL OF SKILL IN THE ART	5
V. CLAIM CONSTRUCTION	6
VI. INFRINGEMENT ANALYSIS FOR DEFENDANT AUDIBLE MAGIC	8
A. ABOUT DEFENDANT AUDIBLE MAGIC CORPORATION	8
B. AUDIBLE MAGIC'S ACCUSED PRODUCTS	10
C.1 '700 PATENT CLAIMS 1, 40	14
C.2 '700 PATENT CLAIM 40.	44
D A PROCESS FOR ANALYZING AND IDENTIFYING AT LEAST ONE SIGNAL, COMPRISING:	44
E.1 '175 PATENT CLAIM 11.	48
VII. CONCLUSION	60

- Web 2.0 UGC Sites (e.g., User Generated Content sites, e.g., Facebook);
- Peer to Peer Software;
- CopySense Appliance (e.g., for Universities and higher-level education);
- Search Engines;
- Consumer Electronics (e.g., Smart Phones, Televisions, Personal Computers)³³; and
- Media Manufacturing Anti-Piracy (use of Replicheck for CD/DVD duplication).



Audible Magic's common deployment architecture is based on "core technology", some, but not all, of which was developed by its subsidiary, Muscle Fish. This core technology is called MFCBR, which stands for Muscle Fish Content Base Recognition. The MFCBR Library is a collection of code, including Muscle Fish fingerprint generation and matching code, that evolved to form the basis for all of Audible Magic's technology. I rely on the following excerpts of deposition transcripts as well as an excerpt of an Audible Magic-produced document in arriving at this conclusion:

Q: We talked a lot in the last couple days about this core technology, the fingerprint generation and the fingerprint matching. Would you consider that Audible Magic's core technology?

A: Yes. Today, yeah. Mm-hmm.³⁴

³³ http://www.audiblemagic.com/pdf/AM_Connected_Device_Services_Data_Sheet.pdf

Q: So the core technology team - are you saying that . . . only the core technology team programs the software that runs the CopySense Appliance?

A: No, we program a part of it.

Q: Which part is that?

A: Well, we have a library which we refer to as MFCBR. . . . and that library, you know, can take different forms, but most of the code is the same. So one version of the library is used in the OEM SDK, and another version is used in the CopySense Appliance.³⁵

A: We called it the MFCBR library.

Q: Now, would you consider that to be core technology when you use the term "core technology"?

A: I would say that that became the core technology of Audible Magic when they acquired us.

Q: And what does "core technology" mean to you when you use that term? Does it mean original?

A: No. I think the reason it's called the core technology - actually, I didn't give it that name. I don't remember who did. But ***it was the internal basic technology on which all the other applications that Audible Magic did were built.***

Q: So Audible Magic built upon this MFCBR library to develop additional programs or different product offerings? Is that correct?

A: Correct.³⁶

Q: . . . From that point on then has Muscle Fish's core technologies, have those technologies become the core technologies that Audible Magic uses?

A: Yes.

Q: So the fingerprinting that Audible Magic does is . . . an evolution of the fingerprinting that was done at Muscle Fish?

A: Yes.³⁷

³⁴ Schrempp, 61:20-25

³⁵ Keislar 20:7-18

³⁶ Wold, 160: 25-162:23 (emphasis added).

Q: Do you know of anything that you're working on that is related to core fingerprint technology that's different from the SDKs or the CopySense Appliance?

A: No.³⁸

"In all of these cases *the Client Application still uses the same Audible Magic client library*. The library is supported on all major computer and mobile platforms."³⁹

Based on my thirty years of experience in the field of signal processing, the materials I relied upon as identified in Section III.A above, and the analysis that follows, it is my opinion that the accused Audible Magic products or services would not function without the common architecture, identified above as the fingerprinting, matching and database. Audible Magic's common architecture is the source of Blue Spike's patent allegations and is essential to each of Audible Magic's accused products and services.

After reviewing the data enumerated in Section III.A above, I provide the following analysis for each of the Blue Spike asserted claims is addressed below.

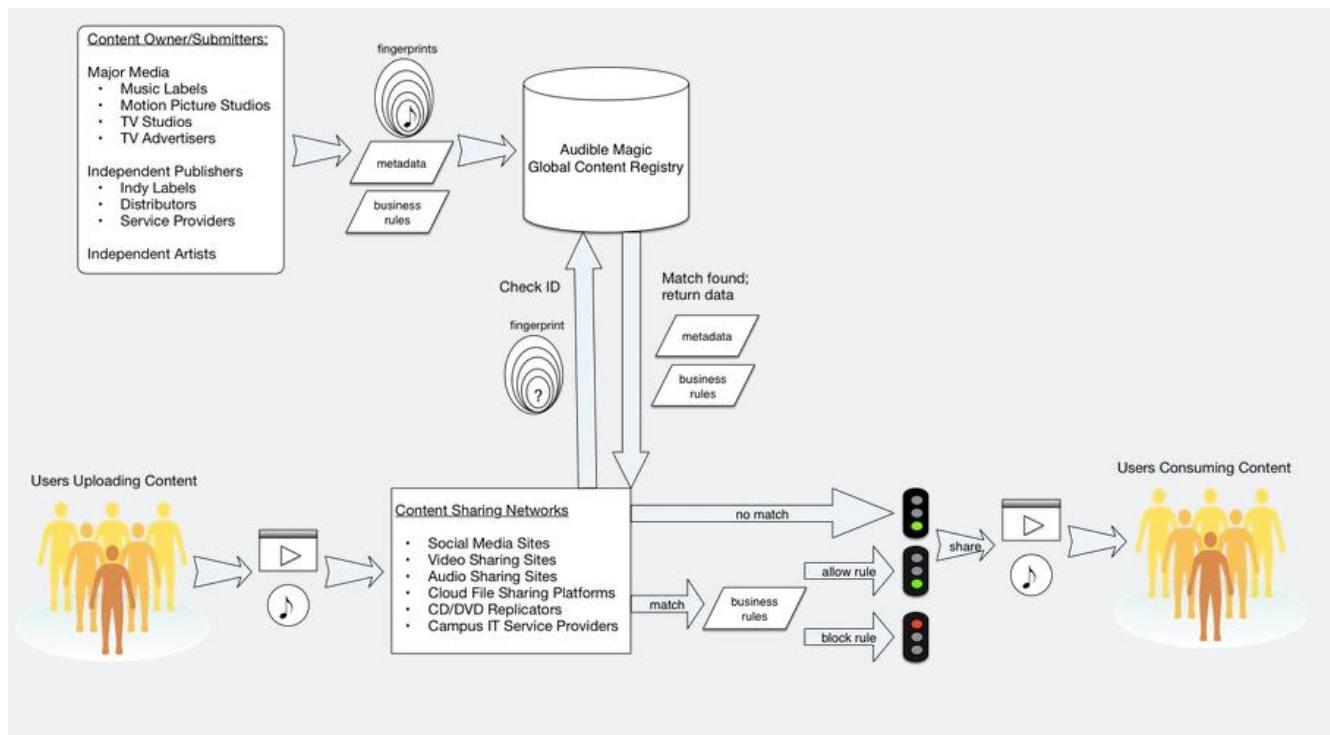
³⁷ Blum, 17:24-18:7

³⁸ Wheaton 132:6-9

³⁹ OEM Application Programming Guide And Customer Support Information. AUDMAG00076019 at page 2.

1. An electronic system for monitoring and analyzing at least one signal, comprising

Audible Magic's website provides numerous flow diagrams depicting "an electronic system for monitoring and analyzing at least one signal." In particular, I include and will refer to a representative diagram for copyright content registration and protection, as shown below:⁴⁰



Audible Magic describes its "automated content identification services" system consistently to both Content Owners/Submitters, shown in the upper left hand corner of the above diagram, as well as to Content Sharing Networks. I provide further detail of how Audible Magic's system works for each of the 700 claim 1 elements below, but the following excerpts from Audible Magic's produced documents reflect, in its own words, an overview of how its system works for both Content Owners and Content Sharing Networks, such as Facebook:

Audible Magic Corp. provides automated content identification services to companies who wish to identify, for purposes of compliance or monetization, media files that are available on the networks or media for which they are responsible. The Audible Magic® technology is deployed by over 150 customers and across a wide range of application areas: disc

⁴⁰ Exhibit F, <http://www.audiblemagic.com/content-registration/>; See also AUDMAG00065446, Appendix A at page 15 (OEM API diagram and process flow overview); AUDMAG00106873 at page 4 (Smartsync); AUDMAG00106844 at pages 3, 4 (Live TViD Architecture and Example); AUDMAG00099923 at slides 6, 7 (Smart ID and Smartsync diagrams).

replicators, major Web 2.0 content (UGC) sites, peer-to-peer (P2P) software, Internet service provider (ISP) networks, and university networks. Audible Magic is the trusted leader in this field, and has a large, accurate database of over 12 million registered works: music, movies, and TV shows.

...

As a content owner, you can benefit in more than one way from registering your audio or video content with Audible Magic. First of all, registration enables the tracking of content usage for monetization opportunities. Secondly, registering protects your content from unauthorized use. Using Audible Magic's services, disc replicators scan CD or DVD masters to identify any registered copyrighted material prior to duplication. On the Internet, Audible Magic's services are used by Web 2.0, ISP, and P2P companies, as well as universities, to prevent the unauthorized posting or transfer of your registered content.

Audible Magic's copyright identification services use a registry of songs, movies, and TV shows matched to a set of business rules supplied by the content owner. The rules can be as simple as "block any unauthorized use" or as detailed as "allow this one Web site to use this one work."⁴¹

"Content Identification Services" means the AM software and services solution that generates an AM Fingerprint for each unknown content file, and uses the unknown AM Fingerprint generated to match to known and registered AM Fingerprints resident in Copyrighted Content Database or Submitted Content Database and supplies AMID Numbers and linked Identification Information including Business Use Rules and Metadata.⁴²

Audible Magic's CopySense content identification technology is available for integration with your own client application. The CopySense content identification OEM API library makes it easy for developers to incorporate content identification into any application or device. The basic content identification system consists of a Client Fingerprinter, an Identification Engine (also known as an Id Server), a Reference Database and an optional Media Information Database.

- The Client Fingerprinter converts the unknown audio into an Audible Magic fingerprint.
- The Reference Database contains fingerprints that have been created from

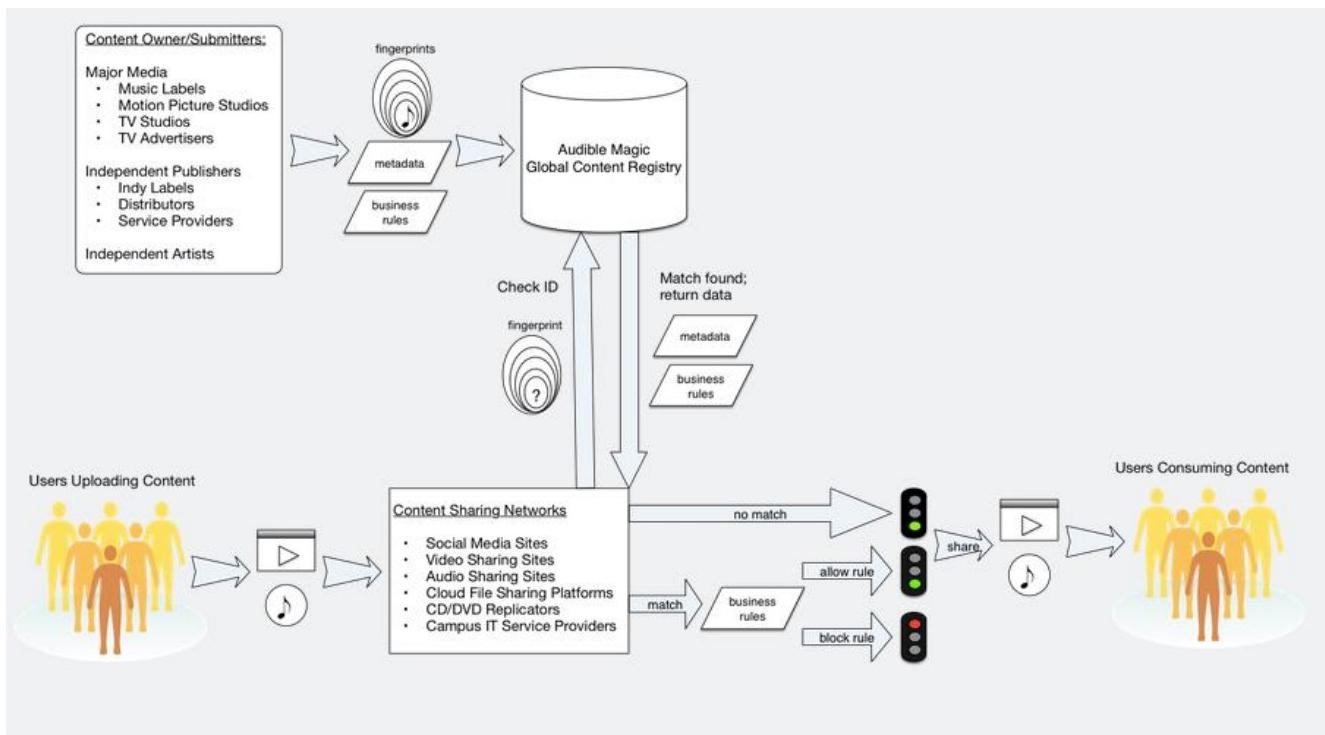
⁴¹ "Teaming Up With Audible Magic: Content Registration", AUDMAG00103772 at page 4.

⁴² Audible Magic's License with Facebook, AUDMAG00065446 at page 2.

- The Media Information Database contains information about each of the reference fingerprints.
- The Lookup Engine does the work to compare the unknown fingerprint against the reference database and to either declare that there has been a match, or that no match has been made. These pieces of the overall solution can be deployed in a number of ways. The Client Fingerprinter is deployed on a system where the unknown audio is available. *This can be a mobile device using a microphone, a client system with access to media files, or perhaps a client system with access to media streams.*⁴³
- The Lookup Engine can be deployed either remotely or locally on the client device. *For instance, a mobile phone, tablet, Television, or set top box can host a Lookup Engine and Reference Database suitable for many applications.* This “local lookup” configuration is useful when a client application wants to remain in very tight synchronization with a media stream—such as when frame accurate positioning is needed. Local Lookup is also useful when an application needs to constantly scan a media stream for some particular content—such as when an application wants to quickly know when one of a set of commercials begins to play.

With this diagram and background in mind, I turn to the individual claim limitations.

⁴³ AUDMAG00103772 at page 1 (emphasis added)



Referring to the diagram above, in the upper left-hand corner, “a first input that receives at least one reference signal [construed as first or original signal] to be monitored” is provided by Content Owners/Submitters. As one of skill in the art with thirty years experience in signal processing, it is evident to me that a first input would be a microphone, line-in input, or even a processor that receives the first reference signal. The first reference signal represents copyrighted media files, including audio or video (most content providers will likely possess a direct digital copy of the audio stream) that these types of entities either wish to protect, to monetize, or to provide free access.⁴⁴

Audible Magic Corp. provides automated content identification services to companies who wish to identify, for purposes of compliance or monetization, ***media files*** that are available on the networks or media for which they are responsible.

...

As a content owner, you can benefit in more than one way from registering your ***audio or video content*** with Audible Magic. First of all, registration enables the tracking of content usage for monetization opportunities. Secondly, registering protects your content from unauthorized use.⁴⁵

⁴⁴ *Id.*

⁴⁵ AUDMAG00103772 at page 4.

[b] a first processor that creates an abstract of each reference signal input to said first processor through said first input wherein the abstract comprises signal characteristic parameters configured to differentiate between a plurality of versions of the reference signal;

1. “*a first processor*”

As one of skill in the art with thirty years experience in signal processing, it is evident to me that a processor is required to run software. Here, Audible Magic provides content providers with a software application, called AMSigGen, to include their copyrighted material in Audible Magic’s database. Although there is no explicit identification of processor requirements in the Content Owners system, I rely on the references in excerpts of Audible Magic’s own documents to Microsoft Windows and Linux platforms, which implicitly require a computer processor, on which to run.

The recommended method is for you, the content owner, to run *amSigGen*, *a small software application from Audible Magic* that generates the digital fingerprint(s) directly from a file (see Appendix A). Audible Magic can customize this software tool to fit into your existing manufacturing or encoding process. *The software features a simple command-line interface, and is available for Microsoft Windows and for Linux.* The software processes one input file at a time, but batch scripts (supplied for Windows) can handle a whole directory of files.

Using amSigGen minimizes network bandwidth requirements. Instead of submitting entire soundtracks or video files, your studio itself generates small digital fingerprints and only needs to transmit those to Audible Magic for registration. Another benefit is that the original audio and video content from the movie or video stays within the premises of your studio.⁴⁶

Audible Magic’s deposition testimony also supports my conclusion that it provides its software technology to Content providers to populate the Audible Magic database with abstracts of reference signals:

Q: What is on the CopySense Appliance that makes the fingerprints that are then transmitted back to Audible Magic?

A: Well, I guess it gets back to what we call the “core technology.” So the core technology that will take audio, make a fingerprint, that’s a set of computer programs and files - mostly files - and that same technology is used by the CopySense Appliance to create a fingerprint from an unknown file. *And that same program is packaged up into a program that we give to what we call a “supplier,” somebody that owns the content and wants*

⁴⁶ *Id.* at page 7 (emphases added).

A. My understanding is that Sony is a provider of reference fingerprints to us and not a customer. But I'm not absolutely sure they're not a customer.

Q. Sure. And then -- so as a provider of reference fingerprints, does that mean that you've provided them with your algorithm such that you -- you get the referenced signature in a form that is compatible with Audible Magic's system?

A. Yes.

Q. What is the name of that?

A. AMSigGen.⁴⁸

As one of skill in the art with thirty years of experience in signal processing (specifically including watermarking technology), I rely upon the above excerpts from Audible Magic's own documentation and deposition testimony excerpts to form my opinion that Audible Magic's provision of Windows- and Linux-compatible "AMSigGen" software implicitly requires use of a processor to function.

2. Abstract:

Referring again to the Court's construction of abstract as "**a data-reduced** representation of a signal that **retains a perceptual relationship** with the signal and **differentiates** the data-reduced representation from other data-reduced representations."⁴⁹, I find ample support that Audible Magic's software meets this limitation through its use of previously-known Mel Frequency Cepstral Coefficient ("MFCC") technology for audio speech recognition.⁵⁰

Before comparing Audible Magic's use of MFCCs to the Court's claim construction, I provide the following brief overview of MFCCs. Original development of MFCCs dates back to the 1980s.⁵¹ It was first used in the field of speech recognition, for example automated phone systems that recognize and respond to a caller's spoken word or number.

Q. Okay. So when you talk about the MFCCs, that is not technology that Audible Magic created, or is it?

A. The idea of those features preexist predicated.

Q. What features?

⁴⁷ Wheaton, 108:15-109:2 (emphasis added).

⁴⁸ Wold at page 102:24 -104:14

⁴⁹ Dkt. 1831, page 32

⁵⁰ BLU0456425-BLU0456429 at page 1.

⁵¹ *Id.*

Q. Okay. Now -- and then when we start to discuss, like -- when you say it predated, Muscle Fish or Audible Magic?

. . .

THE WITNESS: You know, I'm actually -- I'm not even sure the exact date that they were originally used. But they had been in the -- used in the speech community.⁵²

Computing an MFCC generally consists of the following steps:

1. Performing the Fourier transform of a portion of an audio signal;
2. Mapping the powers of the spectrum obtained from the Fourier transform onto the mel scale, using triangular overlapping windows;
3. Taking the logs of the powers at each of the mel frequencies; and then
4. Performing the discrete cosine transform (DCT) of the list of mel log powers, as if it were a signal.

The MFCCs are the amplitudes of the resulting spectrum from the above four-step process.⁵³

Although this four-step process is generally common to all MFCC computations, variations are possible. For example, differences in the shape or spacing of the windows used to map the scale can be used.⁵⁴ Dynamics features such as "delta" and "delta-delta" (first- and second-order frame-to-frame difference) coefficients may also be added.⁵⁵ It may also be possible to increase MFCC robustness in the presence of additive noise such as by increasing the power of the log-mel-amplitudes before taking the DCT, which would reduce the influence of low-energy components.⁵⁶

With this overview of MFCC's in mind, I parse the Court's construction into three categories: i. Retaining a perceptual relationship; ii. Data reduced; and iii. Differentiation between data-reduced representations.

i. Audible Magic's MFCCs Retain Perceptual Relationships

⁵² Wold: 93:22 – 94:11

⁵³ A more detailed description of each of these steps is provided at the tutorial provided at BLU0456425-BLU0456429 at page 1.

⁵⁴ BLU0456077-BLU0456084.

⁵⁵ BLU0456098-BLU0456101.

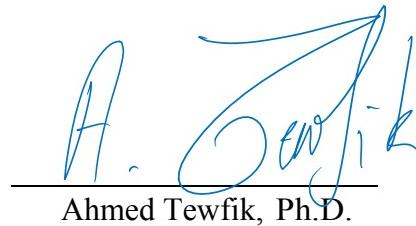
⁵⁶ BLU0456421-BLU0456424.

VII. CONCLUSION

A. Based on the evidence I reviewed, as set forth in Section III.A above, and my analysis set forth immediately above, I opine that Defendant Audible Magic's accused products infringe the following Blue Spike claims are infringed, either literally or under the doctrine of equivalents:

- '700 patent claims 1, 40
- '494 patent claims 1, 11
- '175 patent claims 11, 12, 17
- '472 patent claims 3, 4, 8

B. I reserve the right to supplement or amend this report upon addition requests from Blue Spike's Counsel. I further reserve the right to amend or supplement my opinions based on any new facts, information, or reports of other experts in this matter, subject to Court approval. I also reserve the right to respond to any arguments that may be advanced relating to the subject matter of my opinions. I anticipate preparing exhibits and/or demonstratives based on my work and the information in this report for use at trial, including figures and exhibits included herein as well as different permutations of the scenarios described herein.



A. Tewfik

Ahmed Tewfik, Ph.D.

March 2, 2015